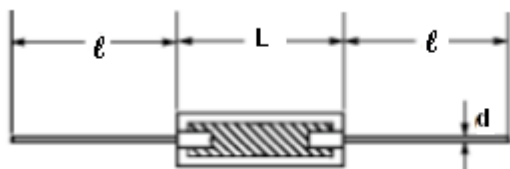


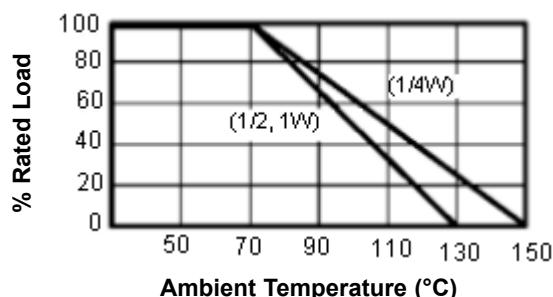
Carbon Composition Resistor



Dimensions



Derating Curve



Ratings and Dimensions

Rated Power (W)	Dimensions in mm				Maximum Rated Voltage (v)	Maximum Overload Voltage (v)	Resistance Range (Ω)	Resistance Tolerance (%)
	L	D	ℓ	d				
0.25	6.3 ±0.7	2.4 ±0.1	30 ±3	± 0.06 0.02	250	400	2.2 Ω 22 MΩ	±5/ ±10
0.5	9.5 ^{+0.8} -0.7	3.6 ±0.2	25 ±1	± 0.7 0.02	350	700	2.2 Ω 22 MΩ	±5/ ±10
1	14.3 ±0.07	5.7 ±0.3	30 ±3	± 0.92 0.02	500	1,000	2.2 Ω 22 MΩ	±10

Dimensions : Millimetres

1 Watt

DC Resistance	DC resistance value must be within the specified tolerance			DC resistance value measured at the test voltage specified below: <table><tr><th>Nominal Resistance</th><th>DC test voltage</th></tr><tr><td>99 Ω and lower</td><td>0.5 V to 1 V</td></tr><tr><td>10 Ω to 999 Ω</td><td>2.5 V to 3 V</td></tr><tr><td>1,000 Ω to 9,999 Ω</td><td>8 V to 10 V</td></tr><tr><td>10,000 Ω to 99,999 Ω</td><td>24 V to 30 V</td></tr><tr><td>100,000 Ω and higher</td><td>80 V to 100 V</td></tr></table>	Nominal Resistance	DC test voltage	99 Ω and lower	0.5 V to 1 V	10 Ω to 999 Ω	2.5 V to 3 V	1,000 Ω to 9,999 Ω	8 V to 10 V	10,000 Ω to 99,999 Ω	24 V to 30 V	100,000 Ω and higher	80 V to 100 V									
Nominal Resistance	DC test voltage																								
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Resistance Temperature Characteristics	<table><tr><th>Nominal Resistance</th><th>Test Temperature at -55°C</th><th>Test Temperature at 100°C</th></tr><tr><td>1 KΩ and under</td><td>6.5 to -3%</td><td>5 to 4%</td></tr><tr><td>1.1 KΩ to 10 KΩ</td><td>10 to -3%</td><td>6 to 5%</td></tr><tr><td>11 KΩ to 100 KΩ</td><td>13 to -3%</td><td>7.5 to 6%</td></tr><tr><td>110 KΩ to 1 MΩ</td><td>15 to -3%</td><td>10 to 7%</td></tr><tr><td>1.1 MΩ to 10 MΩ</td><td>20 to -3%</td><td>10 to 7%</td></tr><tr><td>11 MΩ and over</td><td>25 to -3%</td><td>10 to 7%</td></tr></table>	Nominal Resistance	Test Temperature at -55°C	Test Temperature at 100°C	1 KΩ and under	6.5 to -3%	5 to 4%	1.1 KΩ to 10 KΩ	10 to -3%	6 to 5%	11 KΩ to 100 KΩ	13 to -3%	7.5 to 6%	110 KΩ to 1 MΩ	15 to -3%	10 to 7%	1.1 MΩ to 10 MΩ	20 to -3%	10 to 7%	11 MΩ and over	25 to -3%	10 to 7%	$\frac{R2 - R1}{R1} \times 100 (\%)$ <p>R1: Resistance value at reference temperature R2 : Resistance value at test temperature</p> <p>Sequence of temperature : -25°C, -15°C, -55°C, 25°C, 60°C, 100°C</p>		
Nominal Resistance	Test Temperature at -55°C	Test Temperature at 100°C																							
1 KΩ and under	6.5 to -3%	5 to 4%																							
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11 MΩ and over	25 to -3%	10 to 7%																							
Voltage Coefficient (Application for 1 KΩ minimum)	A total resistance change of 2% maximum or chart below <table><tr><th>Rated Power</th><th>Coefficient Voltage</th></tr><tr><td>1 Watt</td><td>-0.02 % / V</td></tr></table>			Rated Power	Coefficient Voltage	1 Watt	-0.02 % / V	Instantaneous change in resistance per volt based on: $\frac{R - r}{r} \times \frac{100}{0.9 \times RCWW} (\% / V)$																	
Rated Power	Coefficient Voltage																								
1 Watt	-0.02 % / V																								

Carbon Composition Resistor



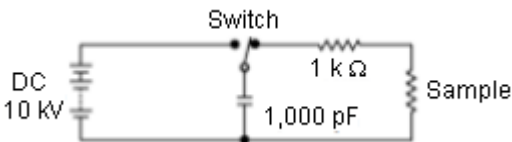
1 Watt

Dielectric Withstanding Voltage	No evidence of flashover, mechanical damage, arcing or insulation breakdown	Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively specified in the above list for 5 s																	
Insulation Resistance	10,000 MΩ Minimum	Resistors shall be clamped in the trough of a 90° metallic V-block and shall be measured at DC 100 V for 1/4 W and DC 500 V for 1/2 W and 1 W																	
Temperature Cycling	±4% Maximum with no evidence of mechanical damage	<div>Resistance change after continuous five cycles for duty cycle specified below</div> <table><tr><th>Step</th><th>Temperature</th><th>Time (minute)</th></tr><tr><td>1</td><td>-55°C</td><td>30</td></tr><tr><td>2</td><td>25°C</td><td>10 to 15</td></tr><tr><td>2</td><td>85°C</td><td>30</td></tr><tr><td>4</td><td>25°C</td><td>10 to 15</td></tr></table>			Step	Temperature	Time (minute)	1	-55°C	30	2	25°C	10 to 15	2	85°C	30	4	25°C	10 to 15
Step	Temperature	Time (minute)																	
1	-55°C	30																	
2	25°C	10 to 15																	
2	85°C	30																	
4	25°C	10 to 15																	
Humidity (Steady State)	±10% Maximum with no evidence of arcing, burning, or charring	Permanent resistance change after the application of a potential of 2.5 times RCWV, or the maximum overload voltage respectively specified in the above list, whichever is less for 5 s																	
Short Time Overload	± (2.5% + 0.05Q) Maximum with no evidence of arcing, burning, or charring	Permanent resistance change after the application of a potential of 2.5 time RCWV, or the maximum overload voltage respectively specified in the above list, whichever is less for 5 s																	
Load Life in Humidity	±20% Maximum with no evidence of mechanical damage	500 hours exposure in a humidity test chamber controlled at 40° ±2°C and 90 to 95 relative humidity																	
Load Life	<table><tr><th colspan="2">Resistance Change</th></tr><tr><td>Average</td><td>±6%</td></tr><tr><td>Maximum</td><td>±10%</td></tr></table>	Resistance Change		Average	±6%	Maximum	±10%	Permanent resistance change after 1,000 hours operating at RCWV, or maximum RCWV, whichever is less with a duty cycle of 1.5 hours "ON", 0.5 hour "OFF" at 70° ±2°C ambient											
Resistance Change																			
Average	±6%																		
Maximum	±10%																		
Terminal Strength	± (1% + 0.05Ω) Maximum with no evidence of mechanical damage	Direct load: Resistance to a 2.5 kgf (25N) direct load for 5 seconds in the direction of the longitudinal axis of the terminal leads Twist test: Terminal leads shall be bent through 90° at a point of 6.35 mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations																	

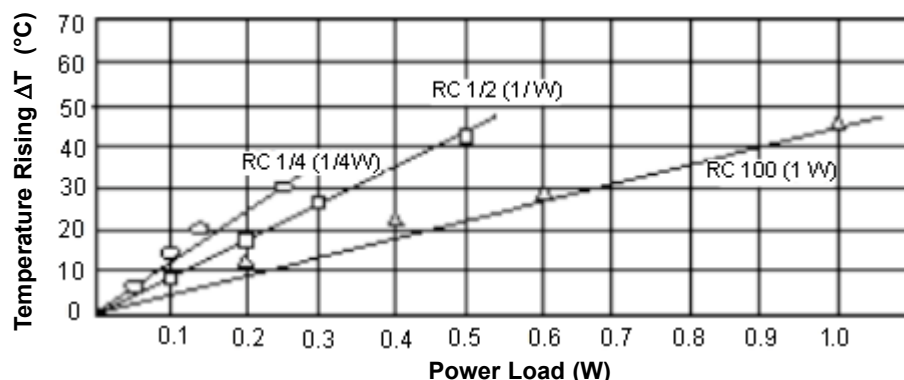
Carbon Composition Resistor



1 Watt

Resistance to Soldering Heat	$\pm (3\% + 0.05 \Omega)$ Maximum with no evidence of mechanical damage	Permanent resistance change when leads immersed 4 ± 0.8 mm from the body in $350^\circ \pm 10^\circ\text{C}$, solder for 3 ± 0.5 s
Vibration	$\pm (1\% + 0.05\Omega)$ Maximum with no evidence of mechanical, electrical damage and electrical discontinuity	A single vibration having an amplitude for 1.6 mm. for 2 hours in each X, Y, Z, direction. One minute between 10 and 55 Hz
Low Temperature Operation	$\pm 3\%$ Maximum with no evidence of mechanical damage	Resistor shall be placed in a cold chamber at room temperature, the temperature shall be gradually decreased to $-65 \pm 10/-5^\circ\text{C}$. After 1 hour of stabilization at this temperature, RCWV or maximum RCWV, whichever less shall be applied for 45 minutes. Return to room temperature. Resistance change measured 24 hours after the test
Solderability	95% coverage Minimum	Test temperature of solder: $230 \pm 5^\circ\text{C}$, Dwell time in solder: 3 ± 0.5 s
Resistance to Solvents	No deterioration of colour code paints	Colour code paints must resist the solvent
Overload Test	$\pm 10\%$ Maximum with no evidence of mechanical damage	In room temperature, 1,350 V ac in 1 second or 1,000 V ac in 1 minute shall be applied
High Voltage Pulse	$\pm 50\%$ Maximum with no evidence of mechanical damage	<p>The resistors are subjected to 50 discharges at a maximum rate of 12 per minute, from a 1,000 pF capacitor charged to 10 kV, in test circuit as shown below</p> 

Hot-Spot Temperature Due to Rate of Power Dissipation



Carbon Composition Resistor



Part Number Table

Description	Part Number
Carbon Composition Resistor	MCRC1/4G103JT-RH



Part Number Explanation:

MCRC	1/4G	103	J	T
Series	Rated Power W	Normal Resistance	Resistance Tolerance	Packaging
Series				
Rated Power W				
Normal Resistance				
Resistance Tolerance				
Packaging				

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